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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte LYUBOV K. GINDIN, RICHARD R. ROESLER,
POLI C. YU, JOSEPH R. KLEER, THOMAS MUENZMAY,
YULIYA BEREZKIN, and MARY A. CRISCI

Appeal 2015-006562
Application 11/208,321
Technology Center 1700

Before ADRIENE LEPIANE HANLON, HUBERT C. LORIN, and
DONNA M. PRAISS, *Administrative Patent Judges*.

PRAISS, *Administrative Patent Judge*.

DECISION ON APPEAL¹

Appellants² appeal under 35 U.S.C. § 134 the final rejection of claims 26–33. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b).

¹ In this decision we refer to the Specification filed August 19, 2005 (“Spec.”), the Final Office Action mailed June 19, 2014 (“Final Act.”), the Appeal Brief filed Nov. 19, 2014 (“Br.”), and Examiner’s Answer mailed Apr. 22, 2015 (“Ans.”).

² Appellants identify the real party in interest as Bayer MaterialScience LLC. Br. 2.

We AFFIRM.

Appellants' invention is said to be directed to "isocyanate-functional polyurethane prepolymers, aqueous dispersions produced from the prepolymers and to the use of the dispersions for producing of materials that can be used in medical applications." Spec. 1. More specifically, the invention is said to be "incorporating small quantities of relatively low molecular weight triols in the production of the isocyanate [prepolymer] used to produce [] the polyurethane dispersion." *Id.* at 3.

Claim 26 is illustrative (disputed terms italicized):

An aqueous polyurethane dispersion produced by reacting:

i) a prepolymer having an NCO content of from about 1 to about 6% by weight, and being prepared by reacting:

A) an organic diisocyanate,

B) at least one dihydroxy compound having a number average molecular weight of from about 700 to about 16,000, and

C) a trihydroxy component of the formula:



where R is a saturated straight chain or branched chain aliphatic group of from 2 to 8 carbon atoms, and

wherein the amount of component C) is such that *the hydroxy groups from component C) amount to from about 2 to 6.93%*

based on the total amount of hydroxy equivalents used to produce the prepolymer

with

ii) *the sodium salt of N-(2-aminoethyl)-2-aminoethane sulfonic acid*, and

iii) an aminic or hydrazinic chain lengthening agent other than the compound used as component ii),

wherein the reaction of i), ii) and iii) is at an NCO to active hydrogen equivalent ratio of from about 3:1 to about 1.4:1.

Appeal Br. 10 (Claims App'x).

The following rejections under 35 U.S.C. § 103(a) are on appeal:

1. Claims 26–29 and 31 over Bechara³ in view of Henning⁴ or Cheng;⁵
2. Claim 30 over Bechara in view of Henning or Cheng; and further in view of Ansell;⁶ and
3. Claims 32 and 33 over Bechara in view of Henning or Cheng and further in view of Daoud⁷ or Bhattacharjee.⁸

ISSUES

The dispositive issues on appeal are whether the Examiner erred in determining that (1) it would have been obvious to use the sodium salt of N-(2-aminoethyl)-aminoethane sulfonic acid (AAS) taught by Henning or Cheng as a dispersity promoting reactant in the aqueous polyurethane dispersion of Bechara which teaches a sodium sulfonate salt as a dispersity promoting reactant in the composition and (2) the difference between 6.93% and 8.2% of claimed component C) content and that of Bechara's Example 3 is close enough that one of ordinary skill in the art would have expected compositions that differ by only this amount to possess the same properties.

³ Bechara et al., US 5,985,955, issued Nov. 16, 1999 (“Bechara”).

⁴ Henning et al., US 4,870,129, issued Sept. 26, 1989 (“Henning”).

⁵ Cheng et al., US 6,191,214, issued Feb. 20, 2001 (“Cheng”).

⁶ Ansell et al., US 5,088,125, issued Feb. 18, 1992 (“Ansell”).

⁷ Daoud, US 4,920,172, issued Apr. 24, 1990 (“Daoud”).

⁸ Bhattacharjee et al., US 2004/0116594, published June 17, 2004 (“Bhattacharjee”).

FINDINGS OF FACT

We find that the following enumerated findings are supported by at least a preponderance of the evidence. *Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1427 (Fed. Cir. 1988) (explaining the general evidentiary standard for proceedings before the Office).

The scope and content of the prior art

1. Bechara is directed to the production of a polyurethane dispersion produced by hydrazinic extension of prepolymers employing polyisocyanates, polyester polyol, dimethylolpropionic acid, and trimethylolpropane. Ans. 2 (citing Bechara, Example 3). Bechara teaches suitable water dispersibility aiding reactants include sodium sulfonate salts of active hydrogen containing compounds, such as diamines, can be reacted during or subsequent to prepolymer formation. *Id.* at 2–3 (citing Bechara, col. 5, ll. 30–32, col. 3, ll. 18–48). A hydrophilicity-imparting agent may be reacted with a formed prepolymer and the reaction carried out with less than a stoichiometric amount of the agent. *Id.* at 3 (citing Bechara, col. 7, ll. 9–20). The trimethylolpropane component, based on hydroxyl equivalents used to produce the prepolymer, is 8.2%. *Id.* at 2 (citing Bechara Example 3); Final Act. 4; Br. 7 (“Example 3 of Bechara utilizes trimethylolpropane in an amount of 8.2% based on the total amount of hydroxyl equivalents used to produce the prepolymer.”).
2. Henning is directed to polyurethane dispersions containing dispersity promoting reactants and specifically the sodium salt of N-(2-aminoethyl)-2-aminoethane sulfonic acid as the reactant for imparting water dispersibility. Ans. 3 (citing Henning, col. 5, ll. 16–23).

3. Cheng is directed to polyurethane dispersions containing dispersity promoting reactants and specifically the sodium salt of N-(2-aminoethyl)-2-aminoethane sulfonic acid as the reactant for imparting water dispersibility. *Id.* (citing Cheng, col. 1, ll. 15–24).

Any differences between the claimed subject matter and the prior art

4. The claimed subject matter combines the sodium salt of N-(2-aminoethyl)-2-aminoethane sulfonic acid as the reactant for imparting water dispersibility with an aminic or hydrazinic chain lengthening agent other than the water dispersibility agent in a polyurethane dispersion formed from a prepolymer prepared by reacting an organic diisocyanate, a dihydroxy compound and a trihydroxy component. Bechara, on the other hand, teaches that suitable water dispersibility aiding reactants include sodium sulfonate salts of active hydrogen containing compounds, such as diamines.
5. The claimed subject matter includes as a component a trihydroxy of the formula $R-(OH)_3$ in an amount such that the hydroxyl groups amount to from about 2 to 6.93% based on the total amount of hydroxyl equivalents used to produce the prepolymer. The amount of trimethylolpropane in Example 3 of Bechara is different such that the hydroxyl groups amount to 8.2% rather than 6.93%.

The level of skill in the art

6. Neither the Examiner nor Appellants have addressed the level of ordinary skill in the pertinent art of polyurethane dispersions. We will therefore consider the cited prior art as representative of the level of ordinary skill in the art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (“[T]he absence of specific findings on the level of skill

in the art does not give rise to reversible error ‘where the prior art itself reflects an appropriate level and a need for testimony is not shown’”) (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985).

Secondary considerations

7. There is no evidence of record of secondary considerations of non-obviousness for our consideration.

ANALYSIS

Appellants do not separately argue the patentability of claims 26–33 in this appeal. Br. 6–9. In accordance with 37 C.F.R. § 41.37(c)(1)(iv), and based upon the lack of arguments directed to the subsidiary rejections, claims 27–33 stand or fall together with claim 26.

Regarding claim 26, the Examiner finds that Bechara does not teach the claimed sodium salt of N-(2-aminoethyl)-2-aminoethane sulfonic acid as the reactant for imparting water dispersibility and relies on Henning or Cheng for teaching the sodium salt of N-(2-aminoethyl)-2-aminoethane sulfonic acid is a known reactant for imparting water dispersibility. Ans. 3. According to the Examiner, an artisan would have been led to include the known dispersity reactant sodium salt of N-(2-aminoethyl)-2-aminoethane sulfonic acid of Henning or Cheng in the polyurethane dispersion of Bechara for the reason that Bechara discloses a dispersity promoting reactant of the same type. *Id.* The Examiner also finds that the amount of trimethylolpropane in Bechara’s Example 3 “is close enough to that claimed [as component C)] that one would have expected the respective polymers to possess the same properties.” *Id.* at 2.

Appellants challenge the rejection of claim 26 by arguing that the sodium salt of N-(2-aminoethyl)-2-aminoethane sulfonic acid taught by Henning and Cheng “would destroy the intended function of Bechara” because “Bechara only teaches production of a polyurethane dispersion by the melt process, for which AAS is not suitable for use.” Br. 7. According to Appellants, “the use of amines (such as AAS) in the process disclosed by Bechara would lead to excess urea formation, resulting in gelation of the prepolymer.” *Id.* Appellants also contend that Bechara’s Example 3 “is very different from the polyurethane dispersion of claim 26” because it does not use the sodium salt of N-(2-aminoethyl)-2-aminoethane sulfonic acid recited in claim 26 as component ii) and it “utilizes trimethylolpropane in an amount of 8.2% based on the total amount of hydroxyl equivalents used to produce the prepolymer” which, Appellants assert, “is not an insubstantial difference” and “significantly (about 15%) higher than the upper limit of 6.93% of component C) recited in claim 26.” *Id.* at 7–8.

We are not persuaded by Appellants’ arguments that the differences between the prior art and claim 26 are more than the predictable use of prior art elements according to their established functions. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007) (citing *United States v. Adams*, 383 U.S. 39, 40 (1966)). Bechara teaches a dispersity promoting reactant of the same type disclosed by Henning and Cheng, thus providing a basis for the combination or substitution of Henning and Cheng’s component for Bechara’s reactant. In our view, the evidence of record is insufficient to establish no reasonable expectation of success in combining the sodium salt of N-(2-aminoethyl)-2-aminoethane sulfonic acid of Henning or Cheng as the dispersity imparting reactant in the polyurethane dispersion of Bechara.

Appellants argue that the references cannot be combined because Bechara uses a melt process and “the use of amines (such as AAS) in the process disclosed by Bechara would lead to excess urea formation, resulting in gelation of the prepolymer.” Br. 7. However, this is merely attorney argument, which cannot be a substitute for factually supported objective evidence. *See, e.g., In re Huang*, 100 F.3d 135, 139–40 (Fed. Cir. 1996); *In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984). Moreover, Appellants do not respond to the Examiner’s findings that Bechara “specifically allows for the use of a genus of compounds that encompasses appellants’ component (ii), namely ‘sodium sulfonate salts, of active-hydrogen-containing compounds, such as diamines’” and that Bechara does not mandate a melt process (Ans. 6). Nor do Appellants respond to the Examiner’s finding that Bechara’s reaction scheme parallels the claimed scheme wherein formed prepolymer (i) is reacted with component (ii). *Id.* at 6, 3 (citing Bechara 3:18–48, 7:9–20).

Similarly, Appellants provide only attorney argument in support of its assertion that the difference in amount of trimethylolpropane is “not an insubstantial difference” and would have us make such a determination “on its face.” Br. 8. Bechara discloses trimethylolpropane, which Appellants do not dispute is encompassed by component C of claim 26, differing only from the claimed amount by 1.27% (characterized by Appellants as a 15% relative difference to the claimed upper limit on the amount). For an obviousness determination, the amount disclosed in the prior art need only be “close enough such that one skilled in the art would have expected them to have the same properties.” *In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003). The Examiner directs us to Example 3 of Bechara to show that there is no

other significant difference between the prior art disclosure and claim 26.

Ans. 7. The Examiner notes that the dimethylolpropionic acid of Example 3 performs the same function within the composition as the claimed sodium salt of N-(2-aminoethyl)-2-aminoethane sulfonic acid, namely providing hydrophilic groups to promote dispersibility. *Id.* The Examiner finds that the disclosed polyol molecular weight overlaps with that of claim 26 throughout its entire range from 700 to 5,000. *Id.* Given that degree of overlap, the Examiner finds that a “skilled artisan would not expect such a relatively small difference to be particularly relevant.” *Id.* The Examiner’s findings with respect to Example 3 are not disputed by Appellants.

The Examiner further finds that it has not been established that the difference between the respective amounts is so extreme as to make a relevant difference. *Id.* Appellants have not shown the particular range claimed to be critical on this record. *See In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990) (where the difference between “the claimed invention and prior art is some range or other variable within the claims . . . in such a situation, the applicant must show that the particular range is *critical*, generally by showing that the claimed range achieves unexpected results relative to the prior art range.”). Moreover, the Specification discloses “that the hydroxyl groups from the triol amount to from about 2 to about 15% based on the total amount of hydroxyl equivalents used to produce the prepolymer” indicating that the upper limit of the range is not critical. Spec. 7. Absent factually supported objective evidence of nonobviousness in this record (FF 7), we are not persuaded as to error in the *prima facie* case of obviousness. *Cf. KSR*, 550 U.S. at 418.

For the foregoing reasons, and the reasons provided in the Answer, we sustain the rejections of claims 26–33 under 35 U.S.C. § 103(a).

DECISION

The Examiner’s decision rejecting claims 26–33 under 35 U.S.C. § 103(a) is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136.

ORDER

AFFIRMED